

Name: _____
A2CC: More Practice with Sequences and Series

Date: _____

Do Now:

1. For some value of x the sequence $2x + 1$, $x + 11$, $4x + 5$ forms the first three terms of an arithmetic sequence.

(a) Find the value of x .

(b) Determine the numerical value of the 15th term of this sequence.

(c) Find the sum of the first 30 terms of this sequence. Show your analysis.

2. In a geometric sequence, the first term is -8 and the eighth term is $17,496$. Determine the second term of this sequence. Show how you arrived at your result.

Practice

WORK SHOULD BE DONE ON A SEPARATE SHEET OF PAPER

For 1- 2: Find the first four terms as well as the tenth term of the sequence with the n th term.

1. $a_n = \frac{n^2}{n+1}$

2. $a_n = (-1)^n \frac{2^n}{n}$

For 3 and 4: A sequence is defined recursively. Find the first five terms of the sequence.

3. $a_n = a_{n-1} + 2n - 1, \quad a_1 = 1$

4. $a_{n+1} = a_n + 2a_{n-1}, \quad a_1 = 1, \quad a_2 = 3$

For 5 – 7: The n th term of a sequence is given

(a) Find the first five terms of the sequence.

(b) Determine if the sequence is arithmetic or geometric. Find d or r .

5. $a_n = 2n + 5$

6. $a_n = \frac{5}{2^n}$

7. $a_n = \frac{3^n}{2^{n+1}}$

For 8 – 10: The first four terms of a sequence are given. Determine whether they can be the terms of an arithmetic sequence, a geometric sequence, or neither. If the sequence is arithmetic or geometric, find the fifth term.

8. $5, 5.5, 6, 6.5, \dots$

9. $\sqrt{2}, 2\sqrt{2}, 3\sqrt{2}, 4\sqrt{2}, \dots$

10. $\sqrt{2}, 2, 2\sqrt{2}, 4, \dots$

11. Show that $3, 6i, -12, -24i, \dots$ is a geometric sequence, and find the common ratio.

12. The sixth term of an arithmetic sequence is 17, and the fourth term is 11. Find the second term.

13. The 20th term of an arithmetic sequence is 96, and the common difference is 5. Find the n th term.

14. The third term of a geometric sequence is 9, and the common ratio is $\frac{3}{2}$. Find the fifth term.

15. The second term of a geometric sequence is 10, and the fifth term is $\frac{1250}{27}$. Find the n th term.

16. Evaluate: $\sum_{k=3}^6 (k+1)^3$

17. If a sequence is defined by the recursive formula:

$$c_1 = 100 \text{ and } c_k = c_{k-1} \cdot \frac{1}{2}$$

then what is the value of $\sum_{k=1}^{10} c_k$. Show how you arrived at your answer.

For 18 and 19: Write the sum using sigma notation. Do not evaluate.

18. $3 + 6 + 9 + 12 + \dots + 99$

19. $1^2 + 2^2 + 3^2 + 4^2 + \dots + 100^2$

20. The first term of an arithmetic sequence is 7, and the common difference is 3. How many terms of this sequence must be added to obtain 325?

21. The sum of the first three terms of a geometric series is 52, and the common ratio is 3. Find the first term.

22. Find the number of terms in the sequence 8, 13, 18, ..., 133.

23. The first term of an arithmetic sequence is 7, and the common difference is -4. Is -4,989 a term of the sequence? If so, which term is it?

24. How many terms are in the arithmetic sequence 5, 11, 17, ... if the sum of the terms of the sequence is 1496?

25. Which term of the geometric sequence 2, 6, 18, ... is 1,062,882?